

The genus *Trichocnemis* LeConte, 1851 (Coleoptera, Cerambycidae, Prioninae)

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Abstract

The history of the genus *Trichocnemis* LeConte, 1851 (Coleoptera, Cerambycidae, Prioninae) is discussed. Its taxonomic status in relation to the genera *Ergates* Audinet-Serville, 1832 and *Callergates* Lameere, 1904 is clarified. The synonymy of *Macrotoma californica* White, 1853, *Macrotoma spiculigera* White, 1853, and *Trichocnemis spiculatus* LeConte, 1851 is confirmed. A key to all three genera and their species is provided.

Keywords

Cerambycidae, Coleoptera, North American Fauna, Prioninae, taxonomy

Introduction

The prionine genus *Trichocnemis* has not been formally recognized in North America since it was placed in synonymy with *Ergates* by Linsley (1962). While the two genera share several characters, and are likely related (Nishio 1956), many characters distinguish the species in these two genera. Earlier authors (Lameere 1901, Casey 1912) considered *Trichocnemis* a subgenus of *Ergates*, as was *Callergates*. More recent authors consider all three as separate genera (Villiers 1978, Jeniš 2001).

Members of all three genera are mainly Holarctic in distribution: *Ergates* occurs in Europe and NW Africa (Jeniš 2008); *Callergates* occurs in Europe and Asia Minor (Jeniš 2001); and *Trichocnemis* occurs in western North America (Linsley 1962). Two species of *Trichocnemis* are recognized: *T. spiculatus* LeConte, 1851 and *T. pauper* Linsley, 1957. The species *T. spiculatus* also has a single subspecies, *T. spiculatus neomexicanus* Casey, 1890. Most species worldwide utilize coniferous hosts, generally in the genus *Pinus* (Pinaceae) (Linsley op.cit., Villiers 1978); however, *T. pauper* is known only from species in the genus *Quercus* (Fagaceae) (Tyson 1967). Typically, recently dead host material is preferred by adult females for oviposition, and larval development ranges from two to four years (Linsley op.cit.), depending upon host and environmental conditions.

Males and females are strongly sexually dimorphic, with males having an enlarged, generally smooth prothorax with less distinct lateral spines, while in females the prothorax is smaller and more distinctly spined at the lateral margins. Adults are frequently attracted to ultraviolet lights at night, and are generally active during July and August (Tyson 1967).

Methods

We examined the external morphology of male and female specimens of *Trichocnemis spiculatus spiculatus*, *T. s. neomexicanus*, *T. pauper*, *Ergates faber* (Linnaeus, 1761), and *Callergates gaillardotii* (Chevrolat, 1854), in addition to male genitalia of one species of each genera as well as both species of *Trichocnemis*, to obtain the conclusions proposed in this study.

Specimens from the following collections were examined for this study:

BMNH	The British Museum of Natural History, London, United Kingdom
CASC	California Academy of Sciences, San Francisco, California, USA
CSCA	California State Collection of Arthropods, Sacramento, California, USA
IRSN	Institute Royal des Sciences Naturelles de Belgique, Bruxelles, Belgium
INIA	Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria, Spain
EMEC	University of California Berkeley, Berkeley, CA USA
USNM	United States National Museum, Washington DC, USA

Taxonomic History

LeConte (1851) described the genus *Trichocnemis* for his new species *T. spiculatus*, stating it was similar to the genus *Ergates* Audinet-Serville, 1832, but differing in the pubescence of the protibiae. Although LeConte did not indicate the sex of the type specimen, his description suggests it was a female: “Tibiae vix compresse, filiformes”;

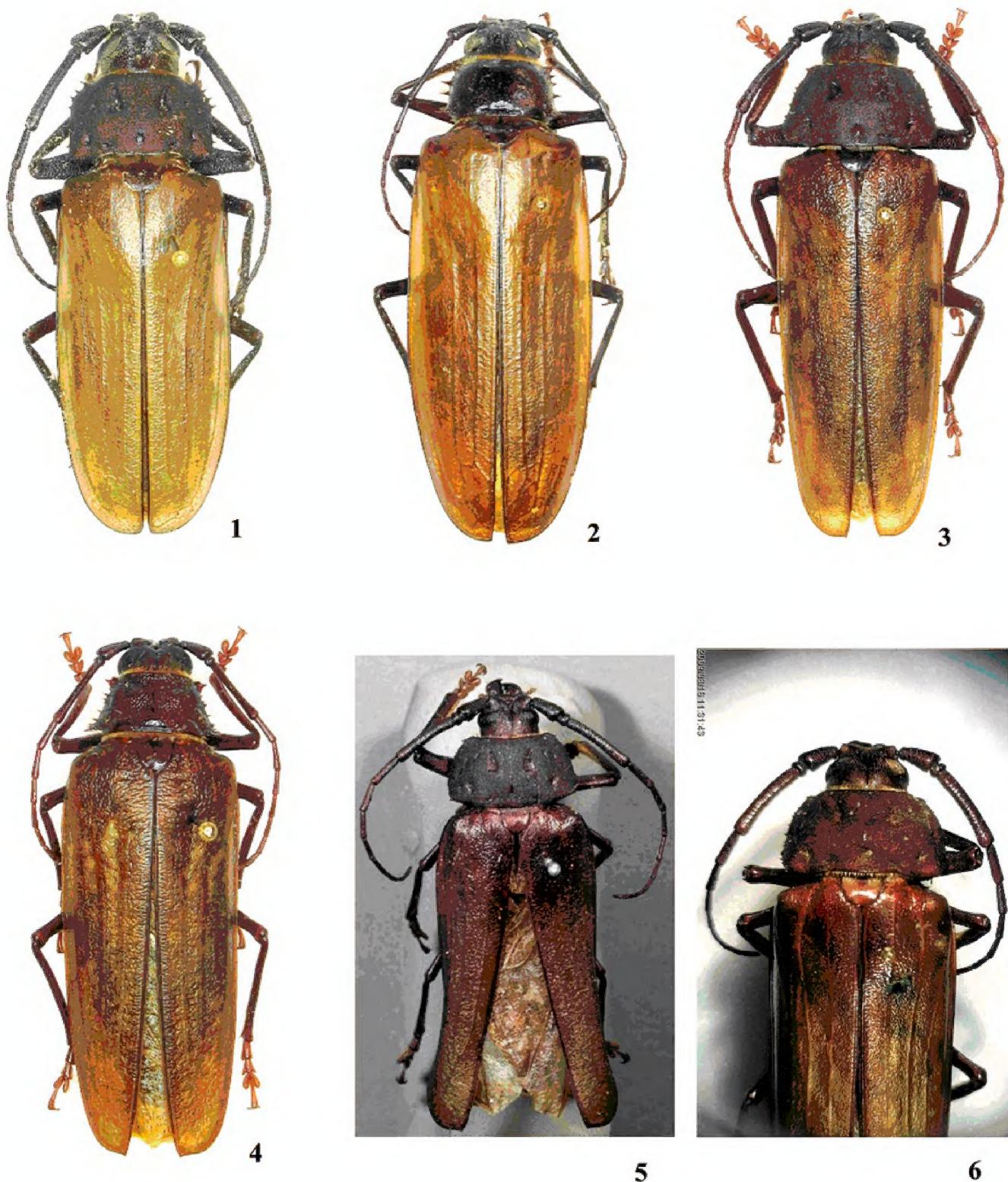
“thorace scabro, dorso antice bicalloso, spiculis lateralibus valde acutis, apicali basali-
que majoribus, thorace latioribus”; “the elytra show some indications of costae”; and
“the joints of the antennae are marked with a few scattered punctures.” However, the
type specimen deposited in the Museum of Comparative Zoology (MCZ) is a male
(MCZWeb 2009). There is little doubt that LeConte (op. cit.) based his description
on a single specimen, since he indicated only a single measurement, stating: “the
specimen appears a little immature.” In males, the tibiae are not clearly filiform, the
prothorax is not scabrous and has well-marked depressions (a character omitted by
LeConte), the pronotal callosities are less pronounced than in females, the lateral
spines of the pronotum are much less prominent than in females, and the proximal
antennomeres are strongly and abundantly punctate. In the type specimen (Fig. 1),
the elytra show clear carinae, a character that does not agree with the original de-
scription.

Although the holotype label of *Trichocnemis spiculatus* in the MCZ indicates “*Ergates*”, and not *Trichocnemis*, it is believed that LeConte himself changed the label after having transferred the species to the genus *Ergates*. This is consistent with other Le-
Conte specimens in which the labels indicate different names than the original taxon, for example: *Mallodon gnatho* LeConte, 1858, which have labels with LeConte’s writing, [*Mallodon (Nothopleurus) gnatho* // Lec. *dentiger* Lec.]. Other specimen labels are clearly not written by LeConte (*vide Mallodon mandibularis* Gemm.).

The genus *Ergates* was established by Audinet-Serville (1832) to accommodate a single species: *Prionus serrarius* Panzer, 1793 (= *Cerambyx faber* Linnaeus, 1761). Among the many characters used to define the genus, Audinet-Serville (op.cit.) listed: legs without internal spines; antennae filiform, similar in both sexes, longer than the body in male, and reaching more or less the middle of elytra in female; antennomere III longer than IV-V together; prothorax finely crenulated laterally in male, more distinctly in female; mandibles and mentum glabrous; legs of medium length, the prolegs longer than the others.

White (1853) synonymized *Trichocnemis* under *Macrotoma* Audinet-Serville, 1832, but this nomenclatural act was not accepted or used by any later author. White (op.cit.) also did not explain why, in his opinion, that genus was synonymous of *Macrotoma*.

LeConte (1854) then synonymized *Trichocnemis* with *Ergates*, stating: “*Trichocnemis* Lec. (Journ. Acad. 2d, 2, 110) is not sufficiently distinct from *Ergates*; the Californian species must therefore be called *E. spiculatus*.” Later, LeConte and Horn (1883) pointed out the same observation of *Trichocnemis* and placed *Ergates* in the tribe Ergatini. However, the characters used to define Ergatini (sensu LeConte and Horn) apply primarily to *Ergates* (= *Trichocnemis*) *spiculatus*, and largely excludes *Ergates faber* (Linnaeus, 1761) (Fig. 2) and *Callergates gaillardoti* (Chevrolat, 1854) (Fig. 3). Le-
Conte and Horn (op.cit.) stated: “the tribe is easily recognized by the prothorax being
much broader in the male than in the female, and finely punctured; in the latter sex
the sculpturing is very coarse, and the small teeth of the lateral margin are longer and
more acute. The head is small, the eyes reniform and coarsely granulated; antennae



Figures 1–6. **1** *Trichocnemis pauper*, male **2** idem, female **3** *T. spiculatus neomexicanus*, male **4** idem, female **5** *T. spiculatus spiculatus*, holotype male (MCZWeb) **6** *Macrotoma californica*, syntype 1.

11-jointed, slender, two-thirds the length of the body in the ♂, about half the length of the body in the ♀, rough with elevated punctures, with the 3rd joint as long as the three following united; poriferous spaces on the 3rd joint small inconspicuous, on the under surface near the distal end, gradually becoming larger, until the outer joints become entirely poriferous, and irregularly reticulated with fine elevated lines forming elongate cells, which are much less distinct, and in fact hardly to be seen in the male.” This tribal description excludes *E. faber* (Fig. 2) because the head is somewhat large, especially in males; the antennae surpass the elytral apex in males; antennomere III is (at most) as long as IV–V together; the pronotum lacks lateral spines in both sexes, and is

not clearly wider in males than in females. *Callergates gaillardotii* can be unsatisfactorily included, because the antennae is somewhat longer than two-thirds the length of the body in male, the antennomere III is shorter than IV-VI together in both sexes, and the teeth of the lateral margin are not “small” in the female.

Lacordaire (1869) did not revalidate *Trichocnemis*, although it is clear he did not agree with LeConte’s (1854) synonymy stating: “Le genre *Trichocnemis* de M. J. L. Le Conte, établi primitivement sur la femelle d’une espèce (3) de Californie, a été reconnu, plus tard, par se savant entomologiste, comme devant rentrer dans celui-ci. Cette femelle, que j’ai sous les yeux, diffère notablement, sous le rapport du *facies*, de celle de *faber*, et à celui d’une *Macrotoma*; son prothorax est multiépineux sur les côtés et les épines sont longues et irrégulières. D’après la description qu’en donne M. J. L. Le Comte, le mâle différerait également, d’une manière sensible, de celui de l’espèce européenne.”

LeConte (1869) was the first author to attribute subgeneric status to *Trichocnemis*, when he listed “*Ergates (Trichocnemis) spiculatus* Lec.” but did not offer an explanation of this new status. Casey (1890) maintained *Trichocnemis* as a subgenus of *Ergates* based on the length of the antennae, anterior legs, and denticulation of the sides of the prothorax, stating: “It seems proper therefore that the name *Trichocnemis* Lec. should be preserved, if not with full generic value, at least as a subgenus.”

Lameere (1901) considered *Trichocnemis* different from *Ergates* (“genre très distinct”), and included both in the tribe “Aegosomites” and subtribe “Callipogonines.” Lameere (1904) assigned *Ergates* to “Callipogonines,” and divided it into three subgenera: *E. (Ergates)*; *E. (Trichocnemis)*; and *E. (Callergates)* Lameere, 1904. *Ergates (Callergates)* is currently considered a different genus (Jeniš 2001, 2008).

Casey (1912) again considered *Ergates* and *Trichocnemis* as distinct taxa, stating: “This genus is distinct from *Ergates* and should be restored. The last joint of the maxillary palpi in *Ergates* is oval and more narrowly truncate at apex, while in *Trichocnemis* it is of a wholly different form, being broadly obtiangular, the sides straight and widely flaring from base to the truncate apex. In the former there is a prominent lateral spiniform tooth at basal third of the prothorax, wanting in the latter, and there are numerous other incongruities. The two genera are related tribally but are unquestionably distinct.” While this diagnosis points out many of the differences between the two genera, several other characters previously mentioned (i.e. antennal length and ratios) were omitted. In addition, Casey (op. cit.) did not indicate a tribal assignment for either of these genera. Nevertheless, taken as a whole, the characters enumerated by Casey (1890, 1912) indicate substantial differences between *Ergates* and *Trichocnemis*.

Nishio (1956) pointed out that “the three species of *Ergates* strongly differ from each other in their morphology” and followed Lameere (1904) in maintaining each species in a different subgenus. Nishio (op. cit.) also compared the male genitalia of the three species, and stated (translated): “The male genitalia of *gaillardotii* and *spiculatus* are similar to each other and probably suggest that they are closely related...”. In addition, Nishio (op. cit.) hypothesized the phylogenetic relationship among the

three taxa, stating that *Callergates gailardoti* is the most ancestral species of “*Ergates*,” *Trichocnemis spiculatus* is sister to it, and *Ergates faber* is the most derived species. Moreover, Nishio (op. cit.) cites Plavilstshikov (1936) as stating that “*spiculatus*” differs from the remaining species (*E. faber* and *C. gailardoti*) and should be classified in a different genus.

Linsley (1962) synonymized *Trichocnemis* under *Ergates*, and assigned it to the tribe Ergatini, stating: “I agree with LeConte and Horn that the characters do not warrant the generic recognition of *Trichocnemis* and that the phylogenetic unity of the group is better indicated by including all four species in *Ergates*”. In placing *Ergates* in the tribe Ergatini, Linsley (op. cit.) apparently ignored the name “*Callipogonitae*” used by Thomson (1861), and gave “*Ergatites*,” used by Fairmaire (1864), priority over the names that appear in Lameere (1904, 1912, 1919): “*Callipogonines*”; *Callipogonini*. There seems little doubt that Linsley was aware of the name “*Callipogonides*” in Lacordaire (1869), and probably incorrectly attributed this taxon to him. This would explain why Linsley (op. cit.) did not use Thomson’s name for *Ergates* and *Callipogon* in the same tribe: “This tribe is represented in America by two genera, *Callipogon* and *Ergates*”. Therefore, to Linsley, *Callipogonini* was equal to Ergatini, and not a different group as considered formerly and by some contemporary authors.

In his work on the Cerambycidae of France, Villiers (1978) considered the three subgenera erected by Lameere (1904) as distinct genera, stating: “*Trichocnemis* J. LeConte et *Callergates* Lameere no sont pas des sous-genres d’*Ergates*, mais des genres bien individualisés”. Villiers (op. cit.), used the tribal name Ergatini, although in a different sense from that employed by Linsley (op. cit.); to him, *Callipogonini* sensu Lameere included more than one tribe, while Linsley (op. cit.) used Ergatini only as a name with priority over *Callipogonini*.

The revalidation of *Trichocnemis* by Villiers (op. cit.) as a separate genus remained unnoticed by many contemporary authors possibly because it was published as a part of a regional faunal account. Nevertheless, subsequent checklists of Western Hemisphere Cerambycidae (Chemsak and Linsley 1982, Monné and Giesbert 1994) unintentionally maintained the synonymy of *Trichocnemis* with *Ergates*.

Although the tribal classification of *Ergates* and *Callipogon* Audinet-Serville, 1832, is beyond the scope of this paper, it is interesting to note Švácha (1987): “I would like to point out that it is undoubtedly incorrect to classify the genera *Ergates* and *Callipogon* in the same tribe, whatever its name may be.” Unfortunately, Švácha did not enumerate the characters he used to base his opinion. Today, researchers of the Neotropical and Nearctic cerambycid fauna use *Callipogonini* sensu Lameere (1904), while those that work with the fauna of Palearctic, Ethiopian, Oriental, and Australian zoogeographic provinces (with some exceptions), do not agree and use more than one tribe to allocate the genera included by Lameere in *Callipogonini*.

A partial bibliography of *Trichocnemis* is listed below, including many citations of the generic name *Ergates* which actually refer to *Trichocnemis* (Monné 2006).

***Trichocnemis* LeConte, 1851**

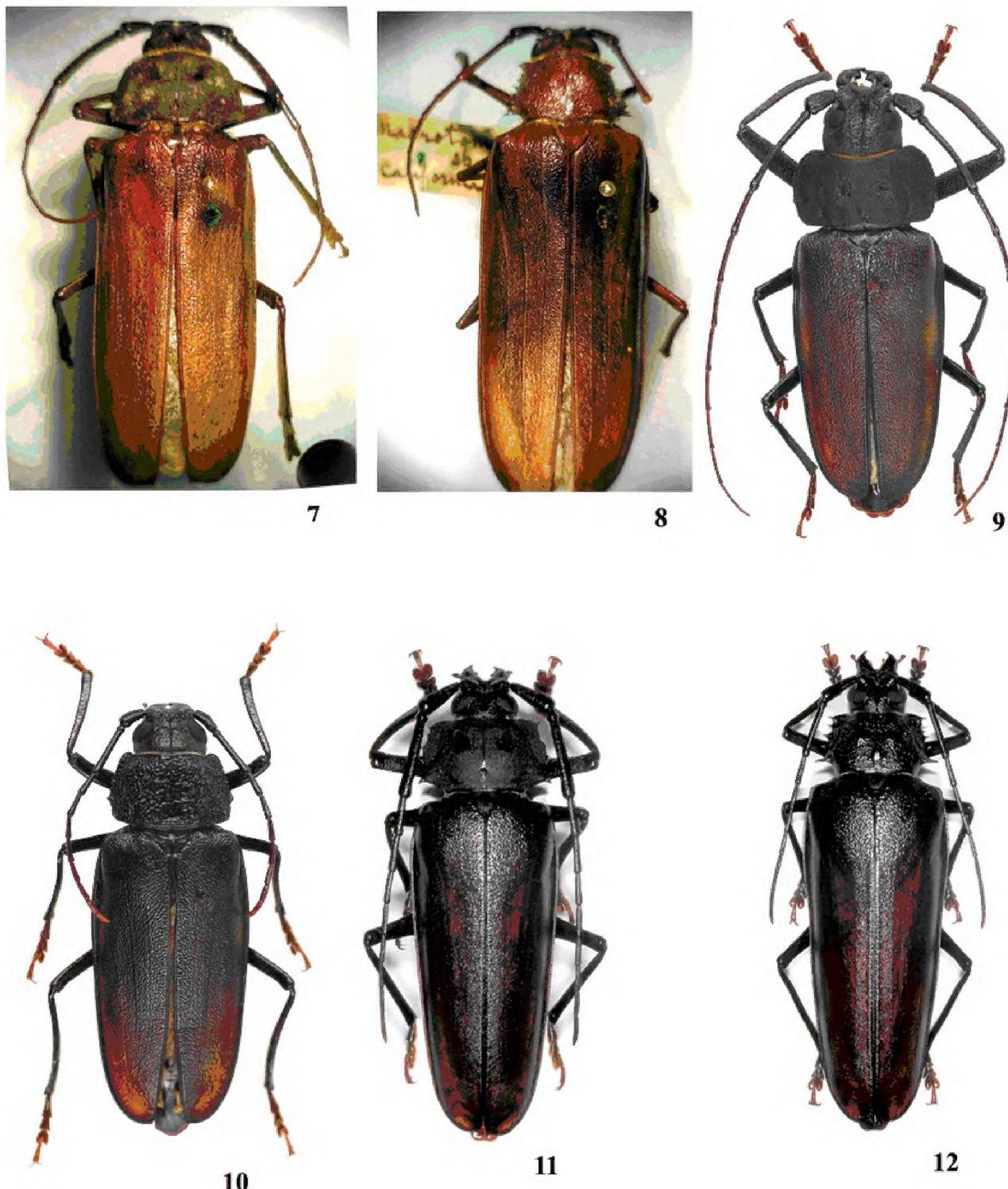
Trichocnemis LeConte 1851: 110 (type species: *Trichocnemis spiculatus* LeConte, 1851, original designation); Melsheimer 1853: 100; White 1853: 35 (syn. under *Macrotoma*); LeConte 1854: 218 (synonymy under *Ergates*); Thomson 1861: 315 (involuntary revalidation); 1864: 298; Lacordaire 1869: 95 (involuntary synonymy); LeConte and Horn 1883: 271 (synonymy); Casey 1912 (revalidation; new status); Linsley 1962: 24 (synonymy); Villiers 1978: 55 (revalidation); Monné 1995: 15 (cat.; involuntary synonymy).

Ergates (*Trichocnemis*) LeConte 1869: 371 (reval.; new status); Casey 1890: 490 (revalidation); 1891: 20; Lameere 1904: 46; 1913: 46 (cat.; reversion of status); Lameere 1919: 81; Blackwelder 1946: 553 (cat.); Nishio 1956: 68.

Ergates Horn 1891: 41; Leng 1884: 8; Arnett 1962: 855; 874; Chemsak 1996: 84; Monné 2006: 37 (cat.; part); Monné and Hovore 2006: 10 (cat.; part).

Macrotoma White 1853: 35 (part).

Redescription. Body large, elongate, integument light brown to dark-brown; in general, elytra lighter than the head and the pronotum. Male (Figs 1,3, 5–7). Head proportionally small; coronal suture clearly surpasses the posterior edge of the eyes; dorsal surface coarsely punctate; pilosity short and scattered. Area behind the eyes confluent punctate; pilosity short and clearly more abundant than in dorsal surface of the head. Antennal tubercles moderately prominent; apex rounded. Eyes small, not as long as scape in lateral view, and lower lobe narrower than scape at its widest point; dorsal interocular space equal or just narrower than twice the width of one upper eye lobe. Hypostomal area depressed to slightly depressed, rugose-punctate. Mandibles shorter than half of the length of the head, strongly curved inwards at almost straight angle; outer surface slightly tumid at basal one-third; inner margin not tumid and not strongly separated by the punctate area. Antennae short, just attaining the apical one-third of the elytra. Scape attaining to just surpassing the posterior edge of the eye lobe. Antennomere III moderately thick, with prominent denticles on ventral and lateral surface; longer than IV–V together. Genal apex spiniform. Maxillary palps short; palpomere II longer than the others; apex of the IV securiform or barely wider than base. Prothorax strongly tumid, entirely micropunctate. Pronotum with two large, deep and subtriangular antero-medial depressions; three punctiform, small, shallow to moderate, lateral antero-medial depressions, arranged diagonally; five punctiform, small, shallow to moderate depressions, at basal area; lateral margins with spines clearly present, longer at anterior and posterior angles; lateral angles rounded; pilosity very short, very scattered (disc almost glabrous), longer and more dense laterally or close to the posterior and anterior angles. Prosternum with short and very scattered pilosity. Prosternal process wide; apex rounded; lateral margins and apical one-third with long dense pilosity. Meso-, metasternum, and metepisternum densely pilose. Elytra rugose-punctate, circum-scutellar area mostly punctate; each elytron with at least two clear carinae; sutural apex with short spine or inermis. Coxae abundantly pilose. Femora with short



Figures 7–12. **7** *Macrotoma californica*, syntype **2** **8** *Macrotoma spiculigera*, holotype female **9** *Ergates faber*, male **10** idem, female **11** *Callergates gaillardoti*, male **12** idem, female.

pilosity, becoming more dense ventrally, mainly at meso- and metafemora; profemora slightly rugose. Protibiae moderately short and thick. Protarsomere I short and wide. Urosternites pilose, mainly laterally. Parameres (lateral lobes) of the tegmen elongated, clearly narrowed, thickened, and carinate at apical half (subcylindrical).

Female (Figs 2, 4, 8). Differing from male in the following manner: antennae reaching or just surpassing middle of the elytra; scape shorter, just attaining the posterior edge of the eyes; antennomere III thinner, lacking denticles; curvature inwards at apex of the mandible at an obtuse angle; prothorax much less tumid; pronotum rugoso-punctate, strongly convex; with callosities in place of the depressions of the antero-medial and basal areas found in males, and without depressions at lateral of the

antero-medial areas; lateral margins with larger and more spines (usually, the spines are bifid or trifid at apex); lateral angles clearly acute; posterior angles rounded; proepisterna coarse punctate; proepimera nearly flat; profemora laterally flattened.

Diagnosis. *Trichocnemis* differs from *Ergates* (Figs 9, 10) in the following manner: head proportionally small (0.6 times greatest width of pronotum in males); mandibles not strongly tumid at basal one-third of the outer surface; inner margin of the mandible not tumid and weakly separated by a punctate furrow; antennae of males do not reach the elytral apex; scape of the males reaches or surpasses the posterior edge of the eyes; antennomere III in males clearly thicker, with denticles, longer than IV and V together; antennomere III in females longer than IV and V together, attaining or almost attaining the base of the prothorax; pronotum distinctly tumid, mainly laterally, with deep and well marked depressions at disc; proepisternum, proepimerum, and prosternum (mainly close to the head) strongly tumid; lateral margins of the pronotum with at least some spines in both sexes; anterior angles of pronotum spinose in both sexes; lateral angle of the pronotum of the males not marked; profemora of males slightly rugose; elytra rugoso-punctate, with clear carinae; protibiae of males moderately short and thick; protarsomere I short and wide in both sexes; parameres of the tegmen elongated, clearly narrowed, thickened, and carinate at apical half.

In *Ergates*, the head is proportionally large (0.6 times greatest width of pronotum in males); mandibles strongly tumid at basal one-third of the outer surface, mainly in males; inner margin of the mandible tumid and strongly separated by a punctate furrow; antennae of males attain or surpass the elytral apex; scape of males not attaining posterior edge of eyes; antennomere III of the males clearly thinner, without denticles, and as long as IV-V together; antennomere III of the females does not attain the base of the prothorax, as long as IV-V together; pronotum not tumid, with callosities in place of the punctate depressions found in *Trichocnemis*; proepisternum and proepimerum not tumid; prosternum not tumid near head; lateral margins of the pronotum crenulated in both sexes; anterior angles of the pronotum wide and rounded in both sexes; lateral angle of the pronotum with prominent spines in both sexes (lateral angles acute in males); profemora of males strongly rugose; elytra coarse and densely punctate, with feeble carinae; protibiae of the males long and narrow; protarsomere I long and narrow in both sexes; parameres of the tegmen short, not narrowed after middle, somewhat concave, thickened only at outer lateral and apical one-third.

Trichocnemis differs from *Callergates* (Figs 11, 12) as follows: eyes not large; prothorax with distinct lateral declivities; genitalia of male shorter, with apex of the parameres of the tegmen thickened at apical half, and the median lobe enlarged at base and distinctly convergent to the apex. In *Callergates* the eyes are large, the prothorax lacks lateral declivities, the genitalia of the male is longer, with the apex of the parameres of the tegmen not thickened at apical half, and the median lobe is distinct narrower at base and slightly convergent to the apex. Additionally, the protibia in males are similar to *Ergates*.

Key to the genera and species of *Callergates*, *Ergates*, and *Trichocnemis*

1 Antennae surpassing middle of elytra; pronotum with distinct small, shining, impunctate areas contrasting with the remainder of the surface. Males 2

— Antennae reaching, at most, middle of elytra; pronotum without distinct small shining, impunctate areas contrasting with the remainder of the surface. Females 5

2(1) Apex of antennal scape not surpassing posterior margin of lower eye lobe; antennomere III slender, lacking denticles; prolegs longer than meso- and metalegs. Europe, NW Africa *Ergates faber* (Linnaeus, 1761) (Fig. 9)

— Apex of antennal scape surpassing posterior margin of lower eye lobe; antennomere III distinctly thickened, with numerous denticles; prolegs not longer than meso- and metalegs 3

3(2) Scape distinctly surpassing the anterior margin of pronotum; antennomere III not distinctly longer than IV and V together; metasternum with a deep, somewhat small depression close to the mesocoxae. Europe, Asia Minor.....
..... *Callergates gaillardotii* (Chevrolat, 1854) (Fig. 11)

— Scape reaching, at most, the anterior margin of pronotum; antennomere III distinctly longer than IV-V together; metasternum without deep depression close to the mesocoxae 4

4(3) Inner apical angles of elytra spined, elytra either uniformly dark brown (California) or with light brown maculae (western USA); lateral spines of pronotum of differing lengths. United States and Mexico (Baja California).....
..... *Trichocnemis spiculatus* LeConte, 1851 (Figs 3, 5–7)

— Inner apical angles of elytra rounded, elytra uniformly light brown, contrasting with pronotum; lateral spines of pronotum generally of equal length. United States (Sierra Nevada and Coast Range mountains of California).....
..... *Trichocnemis pauper* Linsley, 1957 (Fig. 1)

5(1) Distance between upper ocular lobes larger than twice the width of a single lobe; pronotum not spined laterally *Ergates faber* (Linnaeus, 1767) (Fig. 10)

— Distance between upper ocular lobes smaller than twice the width of a lobe; pronotum spined laterally 6

6(5) Apex of antennal scape distinctly surpassing posterior margin of lower eye lobe; antennomere III as long as IV-V together or barely longer.....
..... *Callergates gaillardotii* (Chevrolat, 1854) (Fig. 12)

— Apex of antennal scape not or just surpassing posterior margin of lower eye lobe; antennomere III distinctly longer than IV-V together 7

7(6) Spines of lateral margins of pronotum as long as those at anterior and lateral angles; sutural angle of elytra unarmed.....
..... *Trichocnemis pauper* Linsley, 1957 (Fig. 2)

— Spines of lateral margins of pronotum shorter than those at anterior and lateral angles; sutural angle of elytra with short spine
..... *Trichocnemis spiculatus* LeConte, 1851 (Figs 4, 8)

Conclusions

Our analysis of these taxa, which corroborates that of Villiers (1978) and in part, those of Lameere (1904) and Nishio (1956), supports recognizing *Trichocnemis* and *Ergates* as distinct genera. Additionally, the fact that both species of North American *Trichocnemis* share several distinct characters not present in *Ergates* or *Callergates* further supports this hypothesis.

Summary of taxonomic changes

Trichocnemis spiculatus spiculatus LeConte, 1851 (originally described as *Trichocnemis spiculatus* LeConte, 1851); *Trichocnemis spiculatus neomexicanus* (Casey, 1890) (originally described as *Ergates (Trichocnemis) neomexicanus* Casey, 1890), comb. n.; *Trichocnemis pauper* (Linsley, 1957) (originally described as *Ergates pauper* Linsley, 1957), comb. n.

Synonyms of *Trichocnemis spiculatus* LeConte, 1851

White (1853) described two species from North America (California) that were later synonymized with *T. spiculatus* by Lameere (1904): *Macrotoma californica* and *M. spiculigera*. White's original description leaves some doubt as to the identity of the species involved. For example, in the description of *M. spiculigera*, he stated: "Elytra coriaceous, vermiculated, with three indistinct costae". Similarly, some details of the description of *M. californica* might encompass that of *T. pauper*. Since White probably did not examine the types of these species (frequently he indicated when he did), and his original descriptions do not provide enough detail to diagnose them among other *Trichocnemis*, primarily *T. pauper*, we examined photos of the types, provided by S. Shute (BMNH).

The syntype male of *Macrotoma californica* (Figs 6, 8) and the holotype female of *M. spiculigera* (Fig. 8), are in fact *M. spiculatus*, as suspected by even White (op.cit.) himself: "Trichocnemis spiculatus, Leconte, Journ. Acad. Nat. Sc. Phil. n. s. ii 110?", and "It is possible that this may be the female of the *Macrotoma* *Californica*". Photos of the holotype (Fig. 8) also clearly show three distinct carinae on each elytron, rather than three on the elytra. According to S. Shute (personal communication) the types have the following labels:

Macrotoma californica: Syntype 1 (Fig. 6): White H/W determination label (specimen also bears small circular white H/W BM(HN) registration label upper surface reads California, reverse [18] 48 . 135 (the register states that this specimen was purchased from Hartweg);
Syntype 2 (Fig. 7): no labels other than blue BM(NH) syntype label;

Macrotoma spiculigera (Fig. 8): White H/W label. The reverse of this label has Hermerius struck out in black ink and California written below. The generic name is in the large script of White and must have been the original label. This specimen also has a small white circular registration as for *M. californica* [18]48 . 135 plus BM(NH) red type label.

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References

Arnett RH (1962) The beetles of the United States: A manual for identification. The Catholic University America, Washington, xi + 1112 pp.

Audinet-Serville JG (1832) Nouvelle classification de la famille des longicornes. Annales de la Société Entomologique de France, (1)1: 118–201.

Blackwelder RE (1946) Checklist of the coleopterous insects of Mexico, Central America, the West Indies and South America. Part 4. Bulletin of the United States National Museum 185: 551–763.

Casey TL (1890) Coleopterological Notices. II. Annals of the New York Academy of Sciences 5: 307–504.

Casey TL (1912) Studies in the Longicornia of North America. Memoirs on the Coleoptera 3: 215–376.

Chemsak JA (1996) Illustrated Revision of the Cerambycidae of North America. Volume I. Parandrinae, Spondylidinae, Aseminae, Prioninae. Wolfsgarden Books. Burbank, California, 1: i-x + 150 pp., est. I-X.

Chemsak JA, Linsley EG (1982) Checklist of Cerambycidae. The Longhorned beetles. Checklist of the Cerambycidae and Disteniidae of North America, Central America, and the West Indies. Plexus Publ. Inc., Medford, N.J., 138 pp.

Chevrolat LAA (1854) Coléoptères de Syrie (Suite.). Revue et Magasin de Zoologie (2)6: 479–486.

Fairmaire L (1864) In: Jacquelin DuVal PN. Genera des Coleoptères d'Europe comprenant leur classification en famille naturelle. Author's edition, Paris, 4, 295 pp.

Horn GH (1891) New species and miscellaneous notes. *Transactions of the American Entomological Society* 18: 32–48.

Jeniš I (2001) Long-horned beetles. *Distenidae, Oxypeltidae, Vesperidae, Anoplodermatidae & Cerambycidae I. Vesperidae & Cerambycidae* Evropy / of Europe I. Atelier Regulus, 333 pp.

Jeniš I (2008) The Prionids of the World. Illustrated catalogue of the beetles. *Kulturní Dědictví* (publisher), Czech Republic, vol. 1, 128 pp.

Lacordaire JT (1869) *Histoire Naturelle des Insectes. Genera des Coléoptères ou exposé méthodique et critique de tous les genres proposés jusqu'ici dans cet ordre d'insectes.* Paris. Librairie Encyclopédique de Roret. 8: 1–552.

Lameere AA (1901) Étude sur la Phylogénie des Longicornes. Première communication préliminaire. *Annales de la Société Entomologique de Belgique* 45: 314–323.

Lameere AA (1904) Révision des Prionides. Neuvième mémoire. – Callipogonines. *Annales de la Société Entomologique de Belgique* 48: 7–78.

Lameere AA (1912) Révision des Prionides. Vingt-deuxième Mémoire. - Addenda et Corrigenda. *Mémoires de la Société Entomologique de Belgique* 21: 113–188.

Lameere AA (1913) *Coleopterum Catalogus. Pars 52: Cerambycidae: Prioninae.* W. Junk et S. Schenkling, Berlin, 108 pp.

Lameere AA (1919) Famille Cerambycidae: subfam. Prioninae. Coleoptera. In: *Genera insectorum.* P. Wytsman, Brussels, 172: 1–189, pls. 1–8.

LeConte JL (1851) An attempt to classify the Longicorn Coleoptera of the part of America North of Mexico. *Journal of the Academy of Natural Sciences of Philadelphia* (ser. 2) 2: 99–112.

LeConte JL (1854) Some corrections in the Nomenclature of Coleoptera found in the United States. *Proceedings of the Academy of Natural Sciences of Philadelphia* 7: 216–220.

LeConte JL (1858) Description of New Species of Coleoptera, chiefly collected by the United States and Mexican Boundary Commission, under Major W. H. Emory, U.S.A. *Proceedings of the Academy of Natural Sciences of Philadelphia* 10: 59–89.

LeConte JL (1869) List of Coleoptera collected in Vancouver's Island by Henry and Joseph Matthews, with descriptions of some new species. *The Annals and Magazine of Natural History* 4: 368–385.

LeConte JL, Horn GH (1883) Classification of the Coleoptera of North America. Prepared for the Smithsonian Institution. *Smithsonian Miscellaneous Collections* 26(507): i-xxvii + 1–567.

Leng CW (1884) Synopses of Coleoptera (Cerambycidae). *Bulletin of the Brooklyn Entomological Society* 7: 7–11.

Linnaeus C (1761) *Fauna Suecica sistens animalia Sueciae regni: Mammalia, Aves, Amphibia, Pisces, Insecta, Vermes.* Distributa per classes & ordines, genera & species, cum differentiis specierum, synonymis auctorum, nominibus incolarum, locis natalium, descriptionibus insectorum (ed. 2). Salvius, Holmiae, 46 pp. + 1–578.

Linsley EG (1957) Descriptive and Synonymical Notes on Some North American Cerambycidae (Coleoptera). *American Museum Novitates* 1828: 1–21.

Linsley EG (1962) The Cerambycidae of North America. Part II. Taxonomy and Classification of the Parandrinae, Prioninae, Spondylinae & Aseminae. University of California. Publications in Entomology 19: 1–102.

MCZWeb (2009) MCZ Type Database, Museum of Comparative Zoology, Harvard University, Cambridge, MA. insects.oeb.harvard.edu/MCZ/index.htm [Accessed on September 28, 2009].

Melsheimer FE (1853) Catalogue of the described Coleoptera of the United States. Washington, D.C., Smithsonian Institution, xvi + 174 pp.

Monné MA (1995) Catalogue of the Cerambycidae (Coleoptera) of the western hemisphere. Part XXII. Subfamily Prioninae. Sociedade Brasileira de Entomologia, São Paulo, XXI: 1–115.

Monné MA (2006) Catalogue of the Cerambycidae (Coleoptera) of the Neotropical Region. Part III. Subfamilies Parandrinae, Prioninae, Anoplodermatinae, Aseminae, Spondylidinae, Lepturinae, Oxypeltinae, and addenda to the Cerambycinae and Lamiinae. Zootaxa 1212: 1–244.

Monné MA, Giesbert EF (1994) Checklist of the Cerambycidae and Disteniidae (Coleoptera) of the Western Hemisphere. Wolfsgarden Books. Burbank, California: i-xiv + 1–410.

Monné MA, Hovore FT (2006) Checklist of the Cerambycidae, or longhorned wood-boring beetles, of the Western Hemisphere. Rancho Dominguez, Bio Quip Publications, 394 pp.

Nishio Y (1956) Die Gattung *Ergates* Serville, 1832, insbesondere Phylogenie und Verbreitung der Arten. *Seibutsu Kagaku* 8: 68–73.

Plavilstshikov NN (1936) Cerambycidae (Part 1) In: Faune de l'URSS. Insects Coleopteres, volume 21. Moscow, Leningrad, 612 pp.

Švácha P (1987) In: Švácha P, Danilevsky ML. Cerambycoid Larvae of Europe and Soviet Union (Coleoptera, Cerambycoidea). Part I. *Acta Universitatis Carolinae – Biologica* 30: 1–176.

Thomson J (1861) Essai d'une classification de la famille des cérambycides et matériaux pour servir à une monographie de cette famille. Paris. 396 pp. + 3 pls. [1860: pp. xvi + 128; 1861: pp. 129–396].

Thomson J (1864) *Systema cerambycidarum* ou exposé de tous les genres compris dans la famille des cérambycides et familles limitrophes. Mémoires de la Société Royale des Sciences de Liège 19: 1–578 [1864: pp. 1–352; 1865: pp. 353–578].

Tyson WH (1967) California *Ergates* and *Tragosoma*, with Keys to the Adult and Immature Forms. *Pan-Pacific Entomologist* 43: 122–126.

Villiers A (1978) Faune des Coléoptères de France I. Cerambycidae. Paris, Paul Lechevalier I: i-xxviii + 611 pp.

White A (1853) Catalogue of the coleopterous insects in the collection of the British Museum, pt. VII. Longicornia I, London, 7: 1–174.